REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on August 14, 2002, and the references cited therewith.

Claims 1, 3, 4-6, 7, 10, 17, 20, and 23 are amended, and no claims are canceled or added; as a result, claims 1-23 are now pending in this application.

Claim Objections

Claims 3 and 4 were objected to because claim 3 included "the the" instead of "the", and claim 4 included "on" instead of "one". Applicant has amended claims 3 and 4 to overcome this rejection. These amendments have not been made for reasons of patentability.

Rejections Under 35 U.S.C.§103

Claims 1-4 and 17-19 were rejected under 35 U.S.C.§103(a) as being unpatentable over Mealey et al. (U.S. Patent No. 5,963,737, hereinafter referred to as Mealey) in view of Zumkehr et al. (U.S. Patent No. 6,247,118 B1, hereinafter referred to as Zumkehr).

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). To do that the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would lead an individual to combine the relevant teaching of the references. *Id.* The *Fine* court stated that:

> Obviousness is tested by "what the combined teaching of the references would
> have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413,
> 425, 208 USPQ 871, 878 (CCPA 1981)). But it "cannot be established by
> combining the teachings of the prior art to produce the claimed invention, absent
> some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732
> F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined
> *only* if there is some suggestion or incentive to do so." *Id.* (emphasis in original).

The M.P.E.P. adopts this line of reasoning, stating that

> In order for the Examiner to establish a *prima facie* case of obviousness, three
> base criteria must be met. First, there must be some suggestion or motivation,
> either in the references themselves or in the knowledge generally available to one

of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

In rejecting independent claims 1 and 17, the Office Action admits that Mealey does not teach the following three concepts: 1) a processor executing instructions from a memory hierarchy; 2) a replay handler loaded into the memory hierarchy; and 3) the processor executing a replay handler for replaying at least one instruction. However, the Office Action goes on to assert that Mealey teaches an exception handler "for replaying at least one execution by processing the exception" where "the exception handler is inherently loaded into the instruction cache." The Office Action also asserts that it would have been obvious to re-execute instructions to recover from an exception or error as taught by Zumkehr. Additionally, the Office Action asserts that it would have been obvious to have "the exception handler taught by Mealey et al. be the replay handler taught by Zumkehr et al. ..."

Applicant respectfully submits that the Office Action does not make out a *prima facie* case of obviousness regarding amended independent claims 1 and 17 for the following two reasons: 1) even if combined, the cited references fail to teach or suggest all of the elements of applicant's claimed invention; and 2) there is no suggestion to combine the cited references because a suggestion to combine must come from the prior art and not from Applicant's specification or impermissible hindsight.

In the following discussion of rejected claims 1 and 17, Applicant will first summarize the Mealey and Zumkehr references. Second, Applicant will explain how the Office Action has mischaracterized the references. Third, Applicant will show that the references do not teach all the limitations of the rejected claims. Finally, Applicant will show that there is no motivation to combine the cited references.

Mealey will now be summarized. Mealey teaches a configurable exception handling system that can be tailored to service particular applications by using "kernel extensions." A

kernel extension is "custom software" that is to executed when a particular exception occurs.

See column 3 at line 53, et seq. Before the exception handler can execute a kernel extension, the

kernel extension must be registered in the kernel. After the kernel extension has been registered,

when a particular exception occurs, the exception handler will activate a kernel process that

executes the registered kernel extension. After the kernel executes the kernel extension, it

returns control to the application program. See columns 3-6.

Now Zumkehr will be summerized. Zumkehr teaches a reduced instruction set (RISC)

microprocessor architecture that reduces the amount of stored state information necessary for

recovering from system errors. Zumkehr's architecture adds into the processor's instruction

pipeline a step for validating arithmetic/logic operation results before writing them back to a

register file. See column 9 at line 37. A comparator connected to the processor's execution

mechanism performs the validation step by comparing outputs from the execution mechanism's

master and checker circuits. See Figure 2 and column 10 at line 5. If the master and checker

outputs are not equal, an error flag is set and the results are not written back to the register file.

The architecture additionally calls for storing history tables for the register fetch, execution,

validatation, and write-back stages of instruction pipeline. Because errors are detected before

operands are changed in the register file, the processor can use the history tables to re-execute

error-causing instructions without needing to restore any of the register values. See column 10,

lines 38-54.

Despite correctly pointing out that Mealey does not teach the three concepts noted above,

the Office Action has mischaracterized both Mealey and Zumkehr. Contrary to the Office

Action's assertion, Zumkehr does not teach a replay handler (the Office Action citing Zumkehr at

column 5, line 50). The passage at column 5, line 50 describes recovering from an erroneous

instruction execution by using stored values to re-execute an instruction. More specifically, after

detecting an erroneous instruction execution, Zumkehr's system recovers from the error by re-

executing the instruction using a stored instruction fetch address and pipeline history. Zumkehr's

system differs from a replay handler because a replay handler is used to test a processor by

causing "the processor 104 to enter the replay state." See the detailed description at page 5, lines

4-5. "The replay state is a state where test instructions or code of executions can be executed and

monitored." See the detailed description at page 5, lines 3-4. Thus, Zumkehr's recovery from an erroneous instruction execution is different from a reply handler.

Now turning to amended independent claims 1 and 17. Amended independent claim 1 recites "the processor is configured to test itself by repeatedly executing a plurality of instructions using a replay handler loaded into the memory hierarchy." Amended independent claim 17 recites "repeatedly replaying at least one execution to test for proper operation of a processor." As discussed above, Mealey teaches an exception handling system including a customizable kernel, while Zumkehr teaches an error recovery processor architecture. Therefore, neither Mealey nor Zumkehr, alone or in combination, teach or suggest testing a processor, as set forth in amended independent claims 1 and 17.

In addition to the combination not teaching all the claim elements, there is no teaching or suggestion to combine the cited references. The Office Action does not cite a passage from Mealy or Zumkehr that teaches or suggests combining the teachings of the references. Without such a citation, Applicant respectfully submits that the Office Action relied on the Applicant's disclosure and/or impermissible hindsight in forming the rejection of claims 1 and 17 under 35 USC §103 over the cited references. As such, Applicant respectfully requests that this rejection be withdrawn.

Applicant respectfully submits that claims 1 and 17, as amended, are patentable over the references of record. Accordingly, applicant respectfully submits that claims 1 and 17 are in condition for allowance.

Claims 2-4 and 18-19 depend, directly or indirectly, on claims 1 and 17, respectively, and are patentable over Mealey and Zumkehr for the reasons argued above, plus the elements in the claims. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03.

Claims 5, 10, and 14-16 were rejected under 35 U.S.C.§103(a) as being unpatentable over Mealey (U.S. Patent No. 5,963,737) in view of Argade et al. (U.S. Patent No. 5,724,505; hereinafter referred to as Argade), and further in view of Zumkehr (U.S. Patent No. 6,247,118 B1).

In rejecting amended independent claim 10, the Office Action asserts that Argade teaches an external debug host computer that sends at least one signal or execution for the purpose of debugging. The Office Action further asserts that it would have been obvious to have at least one execution, as taught by Mealey, to come from the external device of Argade.

Applicant respectfully submits that the Office Action does not make out a *prima facie* case of obviousness regarding amended independent claim 10 for the following two reasons: 1) even if combined, the cited references fail to teach or suggest all of the elements of applicant's claimed invention; and 2) there is no suggestion to combine the cited references because a suggestion to combine must come from the prior art and not from Applicant's specification or impermissible hindsight.

Applicant respectfully submits that the cited references do not teach or suggest all the elements of amended independent claim 10. Amended independent claim 10 recites a replay handler. The only way for the cited combination to teach all the elements of claim 10 is for Argade to teach the replay handler that is lacking from Mealey and Zumkehr, as discussed above. As noted, the Office Action asserts that Argade teaches an external debug host computer that sends at least one signal or execution for the purpose of debugging. However, the Office Action does not point to a passage in Argade that teaches a replay handler. Therefore, the cited combination does not teach or suggest all the elements of amended independent claim 10.

In addition to the combination not teaching all the claim elements, there is no teaching or suggestion to combine the cited references. The Office Action does not cite a passage from Mealy, Zumkehr, or Argade that teaches or suggests combining the teachings of the references. Without such a citation, Applicant respectfully submits that the Office Action relied on the Applicant's disclosure and/or impermissible hindsight in forming the rejection of claim 10 under 35 USC §103 over the cited references. As such, Applicant respectfully requests that this rejection be withdrawn.

Claims 5 and 14-16 depend, directly or indirectly, on claims 1 and 10, respectively, and are patentable over Mealey, Zumkehr, and Argade for the reasons argued above, plus the elements in the claims. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03.

Claims 6-9 and 20-22 were rejected under 35 U.S.C.§103(a) as being unpatentable over

Mealey (U.S. Patent No. 5,963,737), in view of Edgington et al. (U.S. Patent No. 5,530,804;

hereinafter referred to as Edgington) and further in view of Zumkehr (U.S. Patent No. 6,247,118

B1). In its rejection, the Office Action asserts that Edgington teaches transferring original code

of the instruction cache to a storage element so that normal mode can be fully restored after

testing and debugging is complete.

Applicant respectfully submits that the Office Action does not make out a *prima facie*

case of obviousness regarding amended independent claims 6 and 20 for the following two

reasons: 1) even if combined, the cited references fail to teach or suggest all of the elements of

applicant's claimed invention; and 2) there is no suggestion to combine the cited references

because a suggestion to combine must come from the prior art and not from Applicant's

specification or impermissible hindsight.

Applicant respectfully submits that the cited references do not teach all the elements of

amended independent claims 6 and 20. Amended independent claim 6 recites a replay handler,

while amended independent claim 20 recites "replaying a system execution a number of times

from a starting point to a stopping point while monitoring state information to test for proper

operation of the processor." Because Mealey and Zumkehr do not teach claim 6's replay handler

and claim 20's processor testing (see above), the only way the combination (Edgington, Mealey,

and Zumkehr) can teach all the elements of amended independent claims 6 and 20 is for

Edgington to teach what Mealey and Zumkehr are lacking. The Office Action does not cite a

passage from Edgington that teaches the cited limitations of claims 6 and 20 and Applicant

knows of no such passage. Therefore, the cited combination does not teach or suggest all the

elements of amended independent claims 6 and 20.

In addition to the combination not teaching all the claim elements, there is no teaching or

suggestion to combine the cited references. The Office Action does not cite a passage from

Mealy, Zumkehr, Edgington that teaches or suggests combining the teachings of the references.

Without such a citation, Applicant respectfully submits that the Office Action relied on the

Applicant's disclosure and/or impermissible hindsight in forming the rejection of claims 6 and 20

under 35 USC §103 over the cited references. As such, Applicant respectfully requests that this rejection be withdrawn..

Claims 7-9 and 21-22 depend, directly or indirectly, on claims 6 and 20, respectively, and are patentable over Mealey, Zumkehr, and Edgington for the reasons argued above, plus the elements in the claims. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03.

Claims 11-13 were rejected under 35 U.S.C.§103(a) as being unpatentable over Mealey et al. (U.S. Patent No. 5,963,737) in view of Edgington et al. (U.S. Patent No. 5,530,804) and further in view of Zumkehr et al. (U.S. Patent No. 6,247,118 B1). Claims 11-13 depend, directly or indirectly, on amended independent claim 10. As discussed above, amended independent claim 10 recites a replay handler. Also as discussed above, the combination of Mealey, Edgington, and Zumkehr does not teach or suggest a replay handler. Therefore, the cited combination does not teach or suggest all the limitations of claims 11-13.

Claim 23 was rejected under 35 U.S.C.§103(a) as being unpatentable over Mealey et al. (U.S. Patent No. 5,963,737) and further in view of Zumkehr et al. (U.S. Patent No. 6,247,118 B1). Applicant respectfully submits that the Office Action did not make out a *prima facie* case of obviousness regarding amended independent claim 23 for the following two reasons: 1) even if combined, the cited references fail to teach or suggest all of the elements of applicant's claimed invention; and 2) there is no suggestion to combine the cited references because a suggestion to combine must come from the prior art and not from Applicant's specification or impermissible hindsight.

Applicant respectfully submits that the cited references do not teach all the elements of amended independent claim 23. Claim 23 recites "repeatedly replaying the at least one execution to test for proper operation of the processor." As discussed above, the cited combination does not teach processor testing as recited in claim 23. Therefore the cited combination does not teach every claim element of amended independent claim 23.

In addition to the combination not teaching all the claim elements, there is no teaching or suggestion to combine the cited references. The Office Action does not cite a passage from Mealy or Zumkehr that teaches or suggests combining the teachings of the references. Without such a citation, Applicant respectfully submits that the Office Action relied on the Applicant's disclosure and/or impermissible hindsight in forming the rejection of claim 23 under 35 USC §103 over the cited references. As such, Applicant respectfully requests that this rejection be withdrawn.

Reservation of Rights

Applicant does not admit that references cited under 35 U.S.C. §§ 102(a), 102(e), 103/102(a), or 103/102(e) are prior art, and reserves the right to swear behind them at a later date. Arguments presented to distinguish such references should not be construed as admissions that the references are prior art.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 371-2159 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

KIRAN A. PADWEKAR

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
Attorneys for Intel Corporation
P.O. Box 2938
Minneapolis, MN 55402
(612) 371-2159

Date _June 19, 2003_   By _Ann M. McCrackin_
                                  Ann M. McCrackin
                                  Reg. No. 42,858

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this __19__ day of June, 2003.

KACIA LEE   _Kacia Lee_
Name   Signature